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EARNED VALUE MANAGEMENT SUPPORT TO SYSTEM
ACQUISITION PROGRAM MANAGERS

Report Number 99-216   July 21, 1999

Office of the Inspector General
Department of Defense

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Acronyms

DCMC	Defense Contract Management Command
EVMS	Earned Value Management System

INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
400 ARMY NAVY DRIVE
ARLINGTON, VIRGINIA 22202-2884

July 21, 1999

MEMORANDUM FOR DIRECTOR, DEFENSE LOGISTICS AGENCY

SUBJECT: Audit Report on Earned Value Management Support to System Acquisition
Program Managers (Report No. 99-216)

We are providing this report for review and comment. This report is the last in a
series of three reports addressing the Defense Contract Management Command support to
system acquisition program managers. Management comments on a draft of this report
were considered when preparing this report.

DoD Directive 7650.3 requires that all recommendations be resolved promptly.
The Defense Logistics Agency comments were partially responsive. We request
additional comments from Defense Logistics Agency on Recommendations 1.b. and 2.a.
by September 20, 1999.

We appreciate the courtesies extended to the audit staff. Questions on the audit
should be directed to Mr. John E. Meling at (703) 604-9091 (DSN 664-9091)
(jmeling@dodig.osd.mil) or Mr. Harold C. James at (703) 604-9093 (DSN 664-9093)
email (hjames@dodig.osd.mil). See Appendix G for the report distribution. The audit
team members are listed inside the back cover.

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Deputy Assistant Inspector General
for Auditing

Office of the Inspector General, DoD

Report No. 99-216
(Project No. 8AE-0025.02)

July 21, 1999

Earned Value Management Support to System Acquisition Program Managers

Executive Summary

Introduction. This report is the last in a series of three reports addressing the Defense Contract Management Command (DCMC) support to system acquisition program managers (program managers). The first report addressed the Cooperative Engagement Capability Program Office's use of DCMC resources and the second report addressed the planning of contract administration support that contract administration offices provide to program managers. This report discusses the earned value management support that the contract administration offices provide to program managers. The DCMC is the DoD Executive Agent for the earned value management system (EVMS) and is responsible for monitoring contractors' compliance with contract EVMS performance management requirements and for providing assistance to program managers in evaluating cost, schedule, and technical progress on contracts.

Objectives. The primary audit objective was to evaluate contract administration office support to program managers. We also reviewed the effectiveness of management controls applicable to the audit objective.

Results. Since the audit was initiated in August 1998, DCMC has invested significant resources to assess and improve its performance as the DoD Executive Agent for EVMS. In April 1999, DCMC completed a preliminary EVMS self-assessment review along with a comprehensive draft action plan to improve the contract administration offices' ability to provide useful earned value management support to program managers. Our audit showed that the contract administration offices could further improve their earned value management support to program managers. Specifically, four of the five contract administration offices that we visited could provide program managers with more insightful system surveillance assessments of the contractors' EVMS. Also, all five contract administration offices could provide more useful analysis of contractor cost, schedule, and performance data to program managers on a more timely basis. As a result, program managers for Defense system contracts were not kept fully informed on whether the contractors' EVMS provided reliable cost, schedule, and technical information and were not receiving timely and useful EVMS data analysis to assist in making program management decisions. Management controls were adequate as applicable to the audit objective. The Finding section provides details on the audit results. Appendix A summarizes the review of the management control program.

The DCMC draft EVMS action plan, along with the recommendations in this report, if implemented, will significantly improve the contract administration offices' ability to provide earned value management support to program managers.

Summary of Recommendations. We recommend revising procedures in Defense Logistics Agency Directive 5000.4, "Defense Contract Management Command One Book," to require contract administration offices to provide system acquisition program managers with more useful EVMS data analysis, to request, whenever possible, on-line

access to contractor EVMS data to generate and report EVMS data analysis in a timely manner, and to coordinate their EVMS reporting requirements to program managers to correspond with the contractors' accounting cycle for reporting contractor performance data. We further recommend that DCMC implement earned value management performance measures and use the DCMC Internet site to provide contract administration offices with information on best practices on earned value management.

Management Comments. The Deputy Director, Defense Logistics Agency, agreed to revise policy and require that contract administration offices provide program managers with annual health assessments of contractor's EVMS and program status reports that include forecasts and risk assessments, based on the contractor's cost and schedule performance data. Also, the Deputy Director identified ongoing DCMC initiatives to gain on-line access to contractor data to improve the timeliness of contract administration office reporting. Additionally, the Deputy Director stated that DCMC was working with contractors to encourage them to improve their EVMS management and that DCMC had completed preliminary testing of an EVMS maturity model that will provide a means for measuring improvement in contract administration office earned value system and program surveillance processes. Further, the Deputy Director stated that DCMC will establish an interactive link to the existing DCMC web site that will allow contract administration offices to exchange earned value best practices. The Office of the Under Secretary of Defense for Acquisition and Technology also responded, stating that the draft recommendation for implementing earned value performance measures should be expanded to include performance measures for gauging contract administration office efforts to encourage contractors to improve their EVMS systems. A discussion of management comments is in the Finding section of the report, and the complete text is in the Management Comments section.

Audit Response. Based on comments from the Office of the Under Secretary of Defense for Acquisition and Technology, we revised the report to include a recommendation that DCMC implement performance measures to objectively measure contract administration offices' efforts to encourage contractors to improve their internal EVMSs. The Deputy Director's comments were generally responsive to recommendations made in the report. However, we request that the Deputy Director provide additional comments concerning the contract administration offices being required to explain variances between their own and contractor's estimates-at-completion. We also request that the Deputy Director identify objective performance measures that DCMC will use to measure contract administration office's efforts to encourage contractors to improve their internal EVMSs. We request the additional comments by September 20, 1999.

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Background

Earned value is a means to objectively measure how much work a contractor has accomplished. An earned value management system (EVMS) is the integrated management system that uses earned value to measure the contractor's work progress. Earned value management is the technique that contractors and Government program managers use to identify cost, schedule, and technical progress on contracts.

DoD formally recognized 32 EVMS criteria that represent the requirements against which it judges the validity of contractors' EVMS. The criteria provide contractors with the flexibility to develop and implement effective management control systems, which are tailored to meet their respective needs, while still ensuring that contractors apply the fundamental EVMS concepts. DoD Regulation 5000.2-R, "Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) Acquisition Programs," Change 3, March 1998, requires contractors to comply with EVMS criteria on significant contracts and subcontracts. Significant contracts are research, development, test, and evaluation contracts and subcontracts with a value of $70 million or more, and procurement contracts and subcontracts with a value of $300 million or more (in FY 1996 constant dollars). Appendix B lists the 32 EVMS criteria.

In December 1995, the Under Secretary for Defense for Acquisition and Technology assigned the Defense Contract Management Command (DCMC) as the DoD focal point for cost and schedule control system criteria (now referred to as EVMS).* In October 1996, the Under Secretary of Defense for Acquisition and Technology expanded the DCMC responsibility to include verifying that contractors comply with EVMS criteria during initial contract compliance reviews, post-acceptance reviews, and deficiency reviews. Within DCMC, contract administration offices are responsible for supporting system acquisition program managers (program managers) with system and program surveillance for assigned contractors. Specifically, the contract administration offices accomplish:

- system surveillance by continuously monitoring contractors' compliance with EVMS criteria, and

- program surveillance by assisting program management offices in evaluating contractor cost, schedule, and technical progress on contracts.

The contract administration offices perform program surveillance and system surveillance to determine whether the contractor's EVMS provides contractors and Government program managers with reliable cost, schedule, and technical performance information to manage contracts. Defense Logistics Agency Directive 5000.4, "Defense Contract Management Command One Book," defines earned value management requirements for contract administration offices.

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*Based on this delegation, DCMC is referred to as the DoD Executive Agent for EVMS

Appendix C delineates the contract administration offices' specific requirements and responsibilities for system and program surveillance.

In August 1998, DCMC initiated an EVMS self-assessment review to establish a baseline for EVMS activity and to provide feedback to the contract administration offices on the effectiveness of earned value management support for program managers. For this review, DCMC organized 6 review teams that visited 54 contract administration offices from August through September 1998. Based on the preliminary results of the review, the teams concluded that the contract administration offices averaged a "mid-level" maturity in developing EVMS processes. The teams defined "mid-level" maturity as indicating that the contract administration offices understood earned value management responsibilities, but did not document the processes involved in meeting the earned value management responsibilities. The results of the self-assessment review are discussed throughout the report and are also summarized in Appendix D.

Objectives

The primary audit objective was to evaluate contract administration offices' support to program managers. In addition, we evaluated the management control program as it related to the audit objective. This report is the last in a series of three reports and addresses the earned value management support that the contract administration offices provide to program managers. The first report addressed the Cooperative Engagement Capability Program Office's use of DCMC resources, and the second report addressed the contract administration support that DCMC provides to program managers. We visited the following five DCMC contract administration offices: Boeing, Seattle, Washington; Lockheed Martin Astronautics, Denver, Colorado; Northrop-Grumman Corporation, Hawthorne, California; Raytheon, Tucson, Arizona; and Santa Ana, California. Appendix A discusses the audit scope and methodology, as well as management controls and prior audit coverage.

Earned Value Management Support

Contract administration offices could improve their earned value management support to program managers. Specifically, four of the five contract administration offices that we visited could provide program managers with more insightful system surveillance assessments of the contractors' EVMS. Also, all five contract administration offices could provide more useful analysis of contractor cost, schedule, and performance data to program managers on a more timely basis. These conditions occurred because the DCMC did not:

- establish requirements for contract administration offices to assess and report to program managers on the overall health of contractor EVMS, to request, whenever possible, on-line access to contractor EVMS data, and to include forecasting and risk assessments in EVMS data analysis;

- develop earned value management performance measures for contract administration offices that objectively measure their efforts to improve earned value management support provided to program managers; and

- fully implement plans to improve earned value management training of staff and share earned value management best practices.

As a result, program managers were not kept fully informed on whether the contractors' EVMS provided reliable cost, schedule, and technical information and were not receiving timely and value-added EVMS data analysis to assist in making program management decisions.

Earned Value Management Policy

DoD Policy. DoD Regulation 5000.2-R states that the purpose of implementing the 32 EVMS criteria is to provide the contractor and the Government program managers with accurate data to monitor contract execution, and:

- to provide uniform evaluation criteria to ensure that contractor cost and schedule management control systems are adequate,

- to provide an adequate basis for responsible decisionmaking,

- to encourage DoD contractors to accept and install management control systems and procedures to meet requirements and control contract performance, and

- to provide a baseline for the Under Secretary of Defense for Acquisition and Technology to evaluate industry, national, and international standards as substitutes for EVMS criteria.

DCMC Policy. Chapter 3.1.2., "Earned Value Management," of Defense Logistics Agency Directive 5000.4, requires that contract administration offices:

- ensure that a contractor's EVMS meets contract requirements and that EVMS data are used for contractor and Government program management;

- support program managers in evaluating the implementation of earned value management on contracts, including participating on integrated program teams and integrated baseline reviews and resolving program managers' concerns about the contractors' EVMS; and

- conduct surveillance of contractors' EVMS through active coordination among the program management offices, contractors, contract administration offices, and the Defense Contract Audit Agency.

Contract Administration Office Earned Value Management Support

The five contract administration offices could improve their earned value management support to program managers for system and program surveillance. Specifically, the contract administration offices needed to provide more system surveillance and annually assess and report on the overall health of contractors' EVMS to program managers. For program surveillance, the contract administration offices needed to improve the quality of EVMS data analysis and reduce the time to report EVMS data analysis to program managers.

System Surveillance. The Defense Federal Acquisition Regulation Supplement, Part 242.3, "Contract Administration Office Functions," requires that DCMC verify the contractors' initial and continuing compliance with the 32 EVMS criteria. EVMS monitors at contract administration offices are responsible for developing and implementing an EVMS surveillance plan for the contractors' EVMS. The EVMS monitor is also responsible for tailoring the level and degree of surveillance to the risks associated with the contractor practices, internal EVMS surveillance activities and willingness to participate in joint surveillance, and program manager concerns. The EVMS monitor reports EVMS surveillance results to program managers in periodic program assessments (referred to as program status reports) or as required in the memorandum of agreement between the contract administration office and the program management office.

Performing System Surveillance. At two of the five contract administration offices, the EVMS monitors needed to perform additional system surveillance activities to ensure that the contractors provided the program managers with reliable cost, schedule, and technical performance measurement information.

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DCMC – Raytheon, Tucson, Arizona. The DCMC – Raytheon, Tucson, Arizona, and the contractor developed a Joint Surveillance Plan requiring the EVMS monitor to conduct periodic surveillance reviews that address all 32 EVMS criteria. From April to September 1998, the EVMS monitor did not conduct regularly scheduled surveillance reviews to ensure that the contractor's system continued to comply with the 32 EVMS criteria. The EVMS monitor was impeded in the ability to perform the planned system surveillance because the monitor was assigned to work on other higher priority requirements. Furthermore, the EVMS monitor's workload increased by at least four contracts in 1998 and could increase by another six contracts in 1999. The EVMS monitor stated that higher priority requirements (including completing baseline change request reviews and performing program surveillance tasks) and the increased workload limited the ability to perform system surveillance. As a result, the EVMS monitor provided limited system surveillance information on the contractor's EVMS to program managers. Since our audit visit, the contract administration office initiated corrective actions to reassign the EVMS monitor's work priorities and to train program support teams in earned value management to support system surveillance activities.

DCMC - Santa Ana, California. The DCMC - Santa Ana, California, regional office supports three contract administration offices located at Boeing Defense and Space Group, Anaheim, California; Boeing Defense and Space Group, Seal Beach, California; and GenCorp Aerojet, Azusa, California. Two of the contract administration offices presented integrated baseline review results as evidence of their EVMS surveillance during FY 1998. Citing acquisition streamlining, the two contract administration offices specified in their EVMS surveillance plans that the integrated baseline reviews would be used to perform their EVMS surveillance requirements. Although integrated baseline reviews are a useful tool to help contract administration offices identify system surveillance issues, the review is a program management function and does not meet the contract administration offices' requirements for system surveillance. Contract administration office participation in the integrated baseline reviews focuses on understanding the technical content of the program baseline and the accuracy of its budgets and schedules. On the other hand, the contract administration office's system surveillance should ensure that the contractor's EVMS provides reliable cost, schedule, and technical performance measurement information on the contractor's progress. In this regard, DoD Regulation 5000.2-R states that integrated baseline reviews are not management system reviews, and that significant management system concerns observed during an integrated baseline review should be referred to the appropriate surveillance activity for action.

DCMC Self-Assessment Review. Similarly, the preliminary results of the EVMS self-assessment review team found that only 47 percent of the contract administration offices performed system surveillance, as required. When system surveillance was not performed, the team concluded that the health of the EVMS was unknown or was assumed to be fine. Also, the review team found that 68 percent of the contract administration offices did not distinguish between the system and program surveillance functions. Specifically, contract administration offices either assumed that program surveillance was sufficient evidence of system surveillance or did not understand the differences between

system and program surveillance functions. The results of the self-assessment review are summarized in Appendix D.

Reporting EVMS Health Assessments. Although three of the five contract administration offices were effective in reporting the results of individual surveillance reviews to program managers, two of the five contract administration offices prepared summary EVMS health assessments that were based on the results of individual system surveillance reviews. By consolidating and assessing system surveillance reviews, the two contract administration offices were able to provide complete EVMS health assessments. Program managers benefit from understanding the contractors' overall EVMS health, from learning the status of EVMS actions during the year, and from receiving assurance that the contractors' EVMS provided reliable cost, schedule, and technical performance measurement information.

DCMC – Raytheon, Tucson, Arizona. During 1997, the EVMS monitor at DCMC - Raytheon Tucson, Arizona, summarized the results of the individual system surveillance reviews into an overall system health report. The report was useful because it summarized the results of the periodic EVMS surveillance reviews, discussed the status of EVMS actions from the reviews, identified Defense Contract Audit Agency EVMS surveillance results, and stated the contractor's performance relative to the EVMS criteria.

DCMC - Lockheed Martin Astronautics Denver, Colorado. During FY 1998, the EVMS monitors planned 26 system surveillance reviews. By September 1998, the contract administration office had completed nine reviews. Although the EVMS monitors used a spreadsheet to internally track and summarize the surveillance reviews, they did not plan to prepare an overall system health assessment report that summarized the results of all 26 reviews. The EVMS monitors could further use the spreadsheet to analyze and communicate systemic issues identified during the surveillance reviews to program managers. For example, in three of the nine surveillance reviews, the EVMS monitors identified surveillance actions that required the contractor to update contract estimates-at-completion. The EVMS monitors did not consider this issue to be a systemic problem. However, if the EVMS monitors planned to perform an overall system health assessment after the 26 system surveillance reviews, they could identify and report systemic issues to program managers and contractors that may include the contractor's contract estimate-at-completion practices.

Program Surveillance. For program surveillance to be effective, the contract administration office needs to provide program managers with timely and useful EVMS data analysis. The memorandum of agreement describes the activities that the contract administration offices will provide to maintain effective program support for the program managers. The memorandum of agreement also outlines the requirements for program support team surveillance. In developing the program surveillance plan, the program support team reviews the contract, risk assessment and mitigation plans, statement of work, work breakdown structure, earned value management plans, and other items used by the contractor to manage cost, schedule, and technical performance. The program support team assesses contractor cost variances, schedule variances, and planned corrective actions, and conducts assessments of the contractor's contract estimate-at-completion. The

EVMS monitor provides the program support team with earned value program information on schedule and technical performance issues, ensuring that the contractor's plan considers facility and performance constraints, and evaluates the revised contract estimates-at-completion.

Value-Added Analysis. All five contract administration offices could improve the usefulness of the EVMS data analysis they provided to program managers. In our survey of program management offices, 22 of 24 stated that the contract administration offices provided some value-added data analysis in the program status report. However, only seven program management offices considered the EVMS information as very important value-added data analysis. The contract administration offices primarily focused their EVMS data analysis on historical information that summarized the events that occurred during the given reporting period and restated the EVMS information already provided to program managers in contractor performance reports. Furthermore, contract administration offices identified variances between contractor and contract administration office contract estimates-at-completion, but they did not always explain the reasons for the variances. The EVMS data analysis would be more useful if it included forecasting of potential technical risks on the contractor's cost and schedule performance. Also, the contract administration offices could better assist program managers by explaining contract estimate-at-completion differences when the contractor and the contract administration office contract estimate-at-completion vary by more than 5 percent.

Timely Reporting. The time needed for contract administration offices to report EVMS data analysis to program managers includes the time from the end of the contractor's accounting cycle until the contract administration office receives the EVMS data and the time the contract administration office needs to analyze and report the EVMS data analysis to program managers. From the end of the contractors' accounting cycle, the five contract administration offices took from 15 to 67 days (an average of 37 days) to report EVMS data analysis to program managers. Lengthy reporting timeframes were caused by contract administration office:

- lack of on-line access to contractor cost and schedule performance data, and

- time required to assess and report the EVMS data analysis to the program manager.

On-Line Access to Contractor Performance Data. When contract administration offices did not gain on-line access to contractor cost and schedule performance data, they took an average of 39 days to report EVMS data analysis to program managers. The contract administration offices decreased their average reporting time from 39 to 24 days when they had on-line access to contractor cost and schedule performance data. While the audit results showed that the average reporting time decreased by 15 days, reductions in reporting time will vary for individual contract administration offices gaining on-line access to contractor cost and schedule performance data. For example, on the Navy F/A-18E/F Program, the Northrop-Grumman Corporation provided the contract administration office with on-line access to its accounting system. As a result, the EVMS monitor reported daily performance results and issued biweekly program

status reports to the contract administration office and the Navy program manager. With on-line access, the F/A-18E/F program integrator was able to resolve program performance cost and schedule issues more quickly. He stated that when the program status reports were distributed, the F/A 18-E/F Program Office was already aware of the issues and, in some cases, had already initiated corrective action.

Assessing and Reporting EVMS Data Analysis. We reviewed 102 program status reports and earned value management reports prepared at the five contract administration offices from April 1998 through August 1998. The program integrators and EVMS monitors averaged 14 days to assess and report data analysis to program managers after they received contractor performance data. In 25 instances, program integrators and EVMS monitors took 20 or more days to analyze the contractor performance data before providing the EVMS information to program managers. The contract administration offices attributed the time to report EVMS data analysis to reporting requirements defined in the memorandum of agreement, earned value management software compatibility problems, and the length of time that the EVMS monitors took to analyze data, research earned value issues, and to document the analysis. The contract administration offices could have reduced the timeframes for reporting, in part, if they established EVMS reporting requirements in the memorandums of agreement that corresponded with the contractors' accounting cycle for reporting contract performance data.

Best Practices. Four of the five contract administration offices were implementing unique earned value management practices that could benefit other contract administration offices. The best practices included:

- gaining on-line access to contractor EVMS data to provide program managers with timely EVMS information (DCMC - Boeing, Seattle, Washington, and DCMC - Northrop-Grumman Corporation, Hawthorne, California),

- developing joint surveillance plans with the contractors that include metrics to measure the health of the contractors' EVMS (DCMC - Lockheed Martin Astronautics Denver, Colorado),

- implementing risk rating systems to evaluate the health of contractors' EVMS (DCMC - Raytheon Tucson, Arizona), and

- using the Defense Contract Audit Agency to assist in EVMS surveillance (DCMC - Raytheon Tucson, Arizona).

Appendix E provides further details on the best practices observed at the four contract administration offices. Sharing best practices information within the Defense Contract Management Command would help contract administration offices improve their EVMS support to program managers.

Although the contract administration offices can make improvements in providing timely and value-added EVMS data analysis to program managers, they also verbally communicate with and provide program insights to program managers from their on-site presence at the contractor locations. Survey results of the

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24 program management offices reinforced this conclusion. The program management offices indicated that the most useful aspect of the contract administration offices' support was that they provided an on-site presence to monitor and work with the contractor. However, contract administration offices also need to provide consistent and timely written reports of EVMS data analysis to program managers to reinforce verbal communications, provide a basis for comparison of EVMS data analysis, and establish a historical record of the EVMS information.

Factors Affecting Earned Value Management Support

The contract administration offices' did not provide more timely and insightful EVMS information because DCMC did not:

- establish requirements for contract administration offices to assess and report to program managers on the overall health of contractor EVMS, to request, whenever possible, on-line access to contractor EVMS data, and to include forecasting and risk assessments in EVMS data analysis;

- develop earned value management performance measures for contract administration offices that objectively measure their efforts to improve earned value management support provided to program managers; and

- fully implement plans to improve earned value management training of staff and share earned value management best practices.

Expanding and Clarifying EVMS Policy and Guidance. Defense Logistics Agency Directive 5000.4 does not require contract administration offices to provide program managers with an overall health assessment of a contractor's EVMS and forecasting and risk assessment of data analysis. Although all five contract administration offices understood the importance of EVMS surveillance, their interpretation and implementation of earned value management policy requirements was inconsistent and could be improved. The preliminary results of the DCMC self-assessment review team also concluded that the contract administration offices were inconsistent in implementing earned value management policy and guidance and recommended that DCMC revise the earned value management policy and guidance to more clearly explain the expectations of the contract administration offices. In addition to implementing the recommendations of the self-assessment review team, the DCMC could further enhance the contract administration offices' EVMS support to program managers by revising Defense Logistics Agency Directive 5000.4 to address the conditions discussed in the "Contract Administration Office Earned Value Management Support" section of this report. Specifically, require the contract administration offices to:

- prepare a summary EVMS health assessment report to the program managers, as discussed in the "Reporting System Health Assessments" subsection;

- provide EVMS information in the program status reports that focuses on forecasts and risk assessments of the work remaining on the contract, as discussed in the "Value-Added Analysis" subsection;

- explain variance of more than 5 percent contract estimate-at-completion between the contract administration office and contractor estimates, as discussed in the "Value-Added Analysis" subsection;

- request on-line access to contractor earned value data, as discussed in the "Access to Contractor Performance Data" subsection; and

- coordinate EVMS reporting requirements in memorandums of agreements with program managers to correspond with the contractors' accounting cycle for reporting contractor performance data, as discussed in the "Assessing and Reporting EVMS Data Analysis" subsection.

The DCMC can also help contract administration offices to improve their EVMS support to program managers by establishing a bulletin board on its web site that would enable contract administration offices to exchange earned value management best practices, as discussed in the "Best Practices" subsection.

Developing Earned Value Management Performance Measures. The DCMC uses performance metrics to measure process improvement at the contract administration offices. For FY 1999, the DCMC established the following two earned value performance metrics for the contract administration offices:

- reduce the number of programs with greater than 10 percent cost overruns, and

- reduce the number of programs with greater than 10 percent schedule slips.

Although the five contract administration offices acknowledged the importance of the earned value performance metrics, they believed that the metrics do not objectively measure the performance of the contract administration offices. The current metrics are meaningful performance measures only if fully mature processes for providing earned value management support are in place at the contract administration offices. However, as discussed in the "Performing System Surveillance" subsection of the "Contract Administration Office Earned Value Management Support" section in this report, EVMS monitors at two of the five contract administration offices needed to perform more system surveillance. The DCMC self-assessment team also concluded that only 47 percent of the contract administration offices performed system surveillance. Furthermore, the contract administration offices understood earned value management responsibilities, but did not document the processes involved in meeting the earned value management responsibilities. Documentation is essential for identifying repeatable earned value management processes and measures to track contract administration office performance. Accordingly, the earned value

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management performance of the contract administration offices could be more effectively measured by implementing performance measures that correlate with the "mid-level" earned value management maturity of the contract administration offices.

The DCMC self-assessment review team developed an EVMS Capability Maturity Model, which provides a five-step process that describes an evolutionary path from level-one maturity to level-five maturity. The DCMC could use the Capability Maturity Model as a self-assessment tool to develop earned value management performance measures to drive process improvement at the contract administration offices. Potentially, performance measures could assess: EVMS maturity, performance of EVMS surveillance activities, program manager satisfaction with the quality of EVMS data analysis, timeliness of EVMS data analysis, and percentage of staff that meet earned value management training requirements.

Earned Value Management Training. Defense Logistics Agency Directive 5000.4 requires that EVMS monitors complete the following two EVMS classes:

- Contractor Performance Management Fundamentals and

- Intermediate Contractor Performance Measurement.

As of February 1999, only 35 of the 141 EVMS monitors (25 percent) in the District West offices had completed the required training. In the draft DCMC self-assessment review action plan, the team recommended that DCMC implement an EVMS training strategy to ensure that EVMS monitors are trained to perform credible and consistent EVMS functions. DCMC plans to use videos, computer-based training, on-site presentations, the EVMS Center homepage, and formal training to accomplish the training strategy. DCMC initiated the EVMS training strategy in April 1999. The recommendations in the self-assessment review action plan will improve the competency of the EVMS staffs at the contract administration offices. Therefore, we have no additional recommendations to make on earned value management staff training at contract administration offices.

Effect on Program Manager Satisfaction

The contract administration offices provide a valuable service to program managers through performing system and program surveillance for assigned contracts. Through continued system surveillance, contract administration offices can ensure that contractors' EVMS provides reliable cost, schedule, and technical information to program managers. Contract administration offices perform program surveillance to provide the program managers with early insights on program execution and performance. Program managers need timely and useful analysis of EVMS data to make management decisions. Our survey of 24 program management offices concerning EVMS support received the following responses:

- 10 program management offices did not receive timely EVMS data analysis to assist in making management decisions,

- 19 program management offices received EVMS data analysis of contractor cost and schedule data that simply restated contract performance information, and

- 5 program management offices did not receive explanations for significant contract estimate-at-completion differences between the contract administration office and contractor estimates. (Ten of the remaining 19 program management offices indicated that they did not have differences of greater than 5 percent between the contractor and contract administration office estimates.)

Appendix F details the EVMS survey questions and summarizes the responses of the 24 program management offices.

Conclusion

Since August 1998, DCMC invested significant resources to assess EVMS and to develop a plan to improve the earned value management support for program managers. However, the contract administration offices could further improve their earned value management support to program managers. Implementing the DCMC self-assessment review recommendations along with revising policy, developing earned value management performance measures, and creating an earned value management best practices Internet site will to help ensure that the contract administration offices provide the required earned value management support to program managers.

Recommendations, Management Comments, and Audit Responses

Revised Recommendation. Based on comments from the Office of the Under Secretary of Defense for Acquisition and Technology, we revised draft Recommendation 2 to include a recommendation that DCMC implement performance measures to objectively measure contract administration offices' efforts to encourage contractors to improve their internal EVMSs, since contractors have the primary responsibility for earned value management.

We recommend that the Commander, Defense Contract Management Command, Defense Logistics Agency:

    1. Revise Defense Logistics Agency Directive 5000.4, "Defense Management Command One Book," to require contract administration offices to:

        a. Prepare and provide program offices with an annual system health assessment of the contractors earned value management system based on the results of individual surveillance reviews and any corrective actions.

Defense Logistics Agency Comments. The Deputy Director, Defense Logistics Agency, concurred, stating that the Defense Logistics Agency posted the recommended revision to Directive 5000.4 on the DCMC Earned Value Management section of the DCMC web site on June 21, 1999, for a 30-day field comment period. He stated that DCMC would complete the recommended action by October 31, 1999.

        b. Provide data analyses in the program status reports that focus on forecasts and risk assessments that are based on the contractor's cost and schedule performance data, and explain variances of greater than 5 percent between the contract administration offices' and the contractors' contract estimate-at-completion.

Defense Logistics Agency Comments. The Deputy Director concurred in principle, stating that the Defense Logistics Agency will incorporate the recommended action on forecasts and risk assessments in the EVMS chapter in Directive 5000.4. In addition, the Defense Logistics Agency revised the Program Integration chapter in Directive 5000.4 to address contract administration office performance of predictive analysis and DCMC provided guidance in the draft EVMS Guidebook for performing predictive analysis using contractor EVMS data. The Deputy Director stated that program offices, in memorandums of agreement, dictate the content of DCMC program status reports and variance reporting requirements and that program offices generally mandated reportable variance breach thresholds within the contract. The Deputy Director stated that DCMC would complete agreed on actions by October 31, 1999.

Audit Response. The comments were partially responsive to the recommendation. The Deputy Director did not address the portion of the recommendation concerning contract administration offices providing data analyses in program analysis reports explaining variances between their own and contractor's estimates-at-completion. In response to the final report, we request that the Defense Logistics Agency provide additional comments concerning contract administration offices explaining variances of greater than 5 percent between their and the contractor's estimates-at-completion.

c. Request, whenever possible, on-line access to contractors' earned value management system data.

Defense Logistics Agency Comments. The Deputy Director concurred in principle, stating that the DCMC has been continuously involved in gaining on-line access to contractor data through the Single Process Initiative and through the DoD Integrated Digital Environment Initiative. He stated that the Defense Logistics Agency must use the Single Process and Digital Environment initiatives for gaining on-line access to preclude DCMC problems with contractual constructive change. The Deputy Director stated that the on-line access initiatives for acquisition program managers are scheduled for completion in January 2002.

Audit Response. The Defense Logistics Agency comments were responsive to the intent of the recommendation. The planned and ongoing actions cited should result in a significant increase in contract administration offices having on-line access to contractor earned value management data.

d. Coordinate the program status reports with the contractor's accounting cycle for reporting contractor performance data to ensure that earned value management system data analysis is reported to the program manager on a timely basis.

Defense Logistics Agency Comments. The Deputy Director concurred in principle, stating that the Defense Logistics Agency is addressing the recommended action as part of DCMC's work with the Services and contractors to implement an integrated digital environment on all acquisition programs that will provide contract administration offices with on-line access to contractor data and reduce the time between data analysis and the contractor's accounting cycle. The Deputy Director estimated DCMC would complete implementation of the integrated digital environment initiative by January 2002.

2. Implement earned value management performance measures that objectively measure contract administration offices' efforts to:

a. Encourage contractors to improve their internal earned value management systems.

Office of the Under Secretary of Defense for Acquisition and Technology Comments. The Director, Systems Acquisition, Office of the Under Secretary of Defense for Acquisition and Technology, stated that the draft Recommendation 2. should be modified to include DCMC implementing management performance measures for gauging contract administration office efforts to encourage contractors to improve their EVMSs.

Defense Logistics Agency Comments. The Deputy Director responded to the added recommendation. He stated that DCMC is working with contractors to encourage them to improve their EVMS management. Specifically, DCMC is partnering with three major prime systems contractors (Boeing, Lockheed Martin Voight, and Raytheon) to improve the quality of their systems use of earned value management. Also, he stated that DCMC is addressing contractor earned value

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management through the DCMC and contractor management councils as another means to achieve recommended improvements. Since DCMC's work with the contractors is a continuous process, the Deputy Director did not provide an estimated completion date.

Audit Response. The comments did not address implementing specific performance measures to objectively measure contract administration office efforts to encourage contractors to improve their internal EVMSs. In response to the final report, we request that the Defense Logistics Agency identify objective performance measures that DCMC will use to measure contract administration office efforts to encourage contractors to improve their internal EVMSs.

b. Improve contract administration offices' system and program surveillance and reflect the contract administration offices' maturity in working with earned value management.

Defense Logistics Agency Comments. The Deputy Director concurred, stating that DCMC is developing an EVMS maturity model, which will provide a measure for gauging improvements in the contract administration office's EVMS and program surveillance processes. He stated that DCMC has completed preliminary testing of the EVMS maturity model and is making adjustments to the model based upon lessons learned from preliminary test results. Once implemented, the model will provide DCMC with a tool for measuring improvement in the contract administration offices' EVMS and program surveillance processes. The Deputy Director stated the maturity model will be deployed to all contract administration offices by September 1, 2000.

3. Establish a best practice web site on the Defense Contract Management Command homepage to enable contract administration offices to exchange earned value management practices.

Defense Logistics Agency Comments. The Deputy Director concurred, stating that DCMC will add an interactive link to the existing DCMC EVMS web site DCMC plans to complete the link by January 1, 2000.

Appendix A. Audit Process

Scope

We conducted the audit from August 1998 through March 1999 and reviewed documentation dated from December 1995 through March 1999 at the DCMC Headquarters, District West Office, Earned Value Management Center, and five contract administration offices. Specifically, we examined memorandums of agreement, EVMS surveillance plans, EVMS reports, contract performance reports, contract administration office reports to program managers, and customer survey data.

DoD-Wide Corporate-Level Government Performance and Results Act Goals. In response to the Government Performance and Results Act, the Department of Defense has established 6 DoD-wide corporate level performance objectives and 14 goals for meeting these objectives. This report pertains to achievement of the following objectives and goals:

- **Objective:** Prepare now for an uncertain future. **Goal:** Pursue a focused modernization effort that maintains U.S. qualitative superiority in key warfighting capabilities. **(DoD-3)**

- **Objective:** Fundamentally reengineer DoD and achieve a 21st century infrastructure. **Goal:** Reduce costs while maintaining required military capabilities across all DoD mission areas. **(DoD-6)**

DoD Functional Area Reform Goals. Most major DoD functional areas have also established performance improvement reform objectives and goals. This report pertains to achievement of the following functional area objectives and goals:

- **Objective:** Delivering great service. **Goal:** Deliver new major defense systems to the users in 25 percent less time. **(ACQ-1.1)**

- **Objective:** Internal reinvention. **Goal:** Minimize cost growth in major Defense acquisition programs to no greater than 1 percent annually. **(ACQ-3.4)**

General Accounting Office High-Risk Area. The General Accounting Office has identified several high-risk areas in the DoD. This report provides coverage of the Defense contract management high-risk area.

Methodology

To evaluate the earned value management support that the contract administration offices provided to program managers, we evaluated DCMC policies and procedures relating to earned value management. We examined the timeliness

and adequacy of contract administration offices' system and program surveillance and reporting to program managers. We also surveyed program management offices to determine their satisfaction with the timeliness and usefulness of EVMS data analysis and reporting.

Auditing Standards. We conducted this program audit in accordance with auditing standards issued by the Comptroller General of the United States, as implemented by the Inspector General, DoD, and accordingly included such tests of management controls as we deemed necessary.

Use of Computer-Processed Data. We did not rely on computer-processed data to perform this audit.

Contacts During the Audit. We visited or contacted individuals and organizations within the DoD. Further details are available upon request.

Management Control Program Review

DoD Directive 5010.38, "Management Control (MC) Program," August 26, 1996, requires DoD managers to implement a comprehensive system of management controls that provides reasonable assurance that programs are operating as intended and to evaluate the adequacy of the controls.

Scope of Review of Management Control Program. We limited our review of the DCMC management control program because DCMC had established and implemented a management control and assessment process to meet the requirements of the policy and procedural directives referenced below:

- OMB Circular A-123, "Management Accountability and Control," June 25, 1995,

- DoD Directive 5010.38, "Management Control (MC) Program," August 26, 1996, and

- DoD Instruction 5010.40, "Management Control (MC) Program Procedures," August 28, 1996

Defense Logistics Agency Directive 5000.4, "Contract Management," requires managers and supervisors at all levels to:

- comply with the DoD Management Control Program and DCMC management control and assessment processes;

- establish management controls (where existing management controls are inadequate or when needed for local implementation);

- assess whether management controls are adequate, identify needed improvements, and implement or direct corresponding corrective action; and

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- review material weaknesses referred from subordinate levels, and support or direct corrective actions as required.

The Directive also requires the commanders of the contract administration offices, Districts, and Headquarters Directors to provide an annual report on the effectiveness of management controls (the Annual Statement of Assurance and Report of Material Weaknesses). Accordingly, we limited our review of management controls to those relating to earned value management. We also reviewed the DCMC self-evaluation of management controls.

Adequacy of Management Controls. The DCMC management controls of earned value management support to program managers were adequate in that we did not identify any material management control weakness applicable to the overall audit objective.

Summary of Prior Coverage

During the last 5 years, the General Accounting Office issued one report addressing earned value management.

GAO/NSIAD-97-108, "Major Acquisitions: Significant Changes Underway in DoD's Earned Value Management Process," May 5, 1997.

Appendix B. Earned Value Management System Criteria

The contractors' management control systems include the EVMS policies, procedures, and methods that are designed to ensure that contractors and Government program managers receive reliable cost, schedule, and technical performance information on contracts. Appendix B defines the 32 industry criteria that DoD adopted to implement EVMS on Defense contracts. The 32 industry criteria are grouped into 5 broad categories of organization; planning, scheduling, and budgeting; accounting considerations; analysis and management reports; and revisions and data maintenance.

Organization

The five EVMS criteria grouped under organization help DoD and contractors ensure that each part of the EVMS is properly established; define the work to be performed; assign the tasks to responsible organizations, including major subcontractors; facilitate the development and collection of information for management purposes; and identify organizational resources that facilitate the preparation of accurate and timely estimates of project cost and schedule completion. The organization criteria require that an EVMS:

- defines the authorized work elements for the program. A work breakdown structure, tailored for effective internal management control, is commonly used;

- identifies the program's organizational structure to include the major subcontractors responsible for the authorized work, and define the organizational elements in which work will be planned and controlled;

- integrates the company's planning, scheduling, budgeting, work authorization, and cost accumulation processes with each other and, as appropriate, the program work breakdown structure and the program organizational structure;

- identifies the company organization or function responsible for controlling overhead (indirect costs); and

- integrates the program work breakdown structure and the organizational structure in a manner that permits cost and schedule performance measurement by elements of either or both structures as needed.

Planning, Scheduling, and Budgeting

Ten EVMS criteria are grouped under planning, scheduling, and budgeting. The DoD and contractors use the process to define the schedule hierarchy that must be established to ensure the proper, effective planning and status of all efforts on the project. The criteria also help contractors to integrate budget and work planning requirements with the program schedules to ensure contract completion. The planning, scheduling, and budgeting criteria require that an EVMS:

- schedules the authorized work, describes the sequence of work, and identifies significant task interdependencies required to meet the program requirements;

- identifies physical products, milestones, technical performance goals, and other indicators that will be used to measure progress;

- establishes and maintains a time-phased budget baseline, at the control account level, against which program performance can be measured. The budget for long-term efforts may be held in higher level accounts until an appropriate time for allocation at the control account level. Initial budgets established for performance measurement will be based on either internal management goals or the external customer-negotiated target cost including estimates for authorized but undefinitized work. On Government contracts, if an over-target baseline is used to report performance measurements, the customer must first be notified;

- establishes budgets for authorized work that identify significant cost elements (for example, labor and material) as needed for internal management and control of subcontractors;

- establishes budgets in dollars, hours, or other measurable units to the extent it is practical to identify the authorized work in discrete work packages. When the entire control account is not subdivided into work packages, identify the long-term effort in larger planning packages for budget and scheduling purposes;

- provides that the sum of all work package budgets plus planning package budgets equals the control account budget;

- identifies and controls level of effort activity by time-phased budgets. Only that effort which is unmeasurable or for which measurement is impractical may be classified as level of effort;

- establishes overhead budgets for each significant organizational component for expenses that will become indirect costs. Reflects in the program budgets, at the appropriate level, the amounts in overhead pools that are to be allocated to the program as indirect costs;

- identifies management reserves and undistributed budgets; and

- provides that the program target-cost goal is reconciled with the sum of all internal program budgets and management reserves.

Accounting Considerations

Six EVMS criteria are grouped under accounting considerations. The DoD and contractors use the criteria to ensure the timely and accurate transfer of actual cost information from the accounting system into the EVMS. The accounting considerations criteria require that an EVMS:

- records direct costs in a manner consistent with the budgets in a formal system controlled by the general books of account;

- summarizes direct costs from control accounts into the work breakdown structure without allocating a single control account to two or more work breakdown structure elements when a work breakdown structure is used;

- summarizes direct costs from the control accounts into the contractor's organizational elements without allocating a single control account to two or more organizational elements;

- records all indirect costs that will be allocated to the contract;

- identifies unit costs, equivalent unit costs, or lot costs when needed;

- provides for in the material accounting system:

  -- accurate cost accumulation and assignment of costs to control accounts in a manner consistent with the budgets using recognized, acceptable, costing techniques;

  -- cost performance measurement at the most suitable time for the category of material involved but no earlier than the progress payment or actual receipt of material; and

  -- full accountability of all material purchased for the program, including the residual inventory.

Analysis and Management Reports

Six EVMS criteria are grouped under analysis and management reports. Managerial analysis is the evaluation and feedback loop for EVMS. The criteria help DoD and contractors ensure that management actions are based on a lower level analysis of problems, corrective actions are implemented, and effects on cost and schedule performance are projected. The analysis and management reports criteria require that an EVMS:

- generates, at least monthly, the following information at the control account level and other levels as necessary for management control, using actual cost data from, or reconcilable with, the accounting system:

    -- comparison of the amount of planned budget and the amount of budget earned for work accomplished to provide the schedule variance, and

    -- comparison of the amount of the budget earned and the actual (applied where appropriate) direct costs for the same work to provide the cost variance.

- identifies, at least monthly, significant differences between both planned and actual schedule performance and planned and actual cost performance, and provides the reasons for the variances in the detail needed by program management;

- identifies budgeted and applied (or actual) indirect costs at the level and frequency needed by management for effective control, and the reasons for any significant variances;

- summarizes the data elements and associated variances through the program organization or work breakdown structure, or both, to support management needs and any customer reporting specified in the contract;

- implements managerial actions taken as the result of earned value information; and

- develops revised estimates of cost-at-completion based on performance to date, commitment values for material, and estimates of future conditions. Compares this information with the performance measurement baseline to identify variances at completion important to company management and any applicable customer reporting requirements, including statements of funding requirements.

Revisions and Data Maintenance

Five EVMS criteria are grouped under revisions and data maintenance. Because changes in major projects are inevitable, the criteria help DoD and contractors to

ensure that a process is in place to incorporate formal changes, conduct internal replanning, and adjust past, present, and future information to accommodate changes. The revisions and data maintenance criteria require that an EVMS:

- incorporates authorized changes in a timely manner and records the effects of the changes in budgets and schedules. Before negotiating a change, bases the revisions on the amount estimated and budgeted to the program organizations;

- reconciles current budgets to prior budgets in terms of changes to the authorized work and internal replanning in the detail needed by management for effective control;

- controls retroactive changes to records pertaining to work performed that would change previously reported amounts for actual costs, earned value, or budgets. Adjustments shall be made only for correction of errors, routine accounting adjustments, customer or management directed changes, or to improve the baseline integrity and accuracy of performance measurement data;

- prevents revisions to the program budget except for authorized changes; and

- documents changes to the performance measurement baseline.

Appendix C. Responsibilities of Earned Value Management System Monitors

DCMC defined earned value management responsibilities for contract administration offices in Defense Logistics Agency Directive 5000.4, Chapter 3.1.2., "Earned Value Management," August 1998, and Chapter 5.1.4., "Program Integration," April 1998. Primarily, contract administration offices are responsible for:

- monitoring contractors' compliance with EVMS requirements and

- assisting in the evaluation of the cost, schedule, and technical progress on a contract as part of an integrated risk assessment program.

To achieve the earned value management responsibilities, the contract administration offices assign EVMS monitors to each contract with EVMS requirements. The EVMS monitors develop advance agreements for contract administration support, provide input to memorandums of agreement, develop EVMS surveillance plans, perform system and program surveillance, and prepare and submit reports to the contract administration and program management offices. The following subparagraphs discuss the responsibilities of EVMS monitors.

Contracts. The contract administration office assigns an EVMS monitor to all contracts with EVMS requirements. When the contract is received, the EVMS monitor determines whether it includes appropriate EVMS surveillance and reporting requirements and then advises the contract administration office of any recommended changes that are due to inappropriate EVMS requirements, work breakdown structure, or variance in analysis reporting requirements.

Advance Agreements. The EVMS monitor confers with the contractor's EVMS representative and the contract administration office on an EVMS advance agreement, which the contract administration office uses to recognize the contractor's EVMS and, once executed, the contractor uses it to demonstrate that EVMS requirements are fulfilled.

Input to the Memorandum of Agreement. The EVMS monitor assists in preparing memorandums of agreement between the contract administration office and the program managers to ensure that the contract administration office system and program surveillance requirements are integrated. The memorandums of agreement identify the contract administration office requirements for surveilling the contractor's cost, schedule, and technical performance and for earned value management reporting to the program management office.

EVMS Surveillance Plan. The EVMS monitor develops a formal EVMS surveillance plan to connect surveillance tasks to the contractor's EVMS processes. The purpose of the EVMS surveillance plan is to ensure that the contractor effectively uses EVMS data to manage contracts. The EVMS monitor tailors the level and degree of system surveillance to:

- risk areas associated with contractor management practices that differ from EVMS processes,

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- contractor internal EVMS surveillance activities,

- contractor willingness to participate in joint (DCMC-contractor) surveillance, and

- Government program manager concerns.

In developing EVMS surveillance plans, the EVMS monitor should coordinate the surveillance plan with the contractor, the contract administration office, the major subcontractors' contract administration offices, the program manager, and the Defense Contract Audit Agency field office to ensure that EVMS surveillance is performed effectively without duplication.

System and Program Surveillance. The EVMS monitor performs system surveillance as documented in the EVMS surveillance plans and the program support teams perform program surveillance on the program. The program support teams assess contractor cost and schedule variances, planned corrective actions, and contract estimates-at-completion.

Reports. The EVMS monitor provides the contract administration office and the program management office with an assessment of the contractor's EVMS procedures periodically or as required in the memorandum of agreement. The EVMS monitor advises the contractor of any significant system deficiencies and follows up to determine whether the contractor has taken effective corrective action. The program integrator also submits periodic reports to the program manager, which are tailored to address program manager concerns.

Appendix D. Earned Value Management System Self-Assessment Review

On August 28, 1998, the DCMC Executive Director, Contract Management Operations, directed an internal self-assessment review of the DCMC earned value management role. The DCMC organized a team of 25 people from DCMC Headquarters, District offices, the EVMS Center, and contract administration offices. The DCMC divided the team into 6 sub-teams that visited 54 contract administration offices. To gather data for the self-assessment review, the sub-teams obtained contract administration office responses to a nine-question survey that addressed the following areas:

- DCMC role as DoD Executive Agent for EVMS;

- system surveillance; and

- useful program analysis and reporting.

The DCMC plans to use the results of the self-assessment review to establish a baseline for EVMS performance, to develop the new Defense Logistics Agency Directive 5000.4 earned value management chapter, and to ensure that customers receive value-added earned value management support from contract administration offices. The DCMC final self-assessment review results were available in late-April 1999.

Preliminary Self-Assessment Review Results. The preliminary self-assessment review results identified two challenges facing DCMC:

- improve DCMC maturity in executing EVMS responsibilities, and

- reduce the variation among contract administration offices in EVMS practices.

    Maturity. The team concluded that DCMC was at a "mid-level" maturity in its EVMS processes. The team used the survey questionnaire to rate the contract administration offices' maturity on a scale ranging from one (indicating low maturity) through five (indicating high maturity) in executing DCMC responsibilities as DoD Executive Agent for EVMS. The team summarized the contract administration offices' responses and assessed the range of responses to each question. The contract administration offices averaged a three rating or "mid-level" maturity, which indicated that the contract administration offices understood their EVMS responsibilities but lacked documentation of the activities involved in meeting EVMS responsibilities. The team also provided detailed summaries of maturity levels for individual contract administration offices. The team indicated that the contract administration offices' lack of documentation may be a symptom of the move to an integrated product team approach and informal meetings, the lack of DCMC guidance on documenting earned value activities, or the lack of EVMS training tailored to the in-plant environment. The team also indicated that the lack of documentation hindered the development of repeatable processes and performance measures to

accurately track contract administration office earned value management performance. At "mid-level" maturity, the contract administration offices operate autonomously and generally reflect the skills and commitment of the EVMS monitor, rather than the strength of contract administration office processes. Details of the team's conclusions regarding the contract administration offices' maturity for the DCMC EVMS Executive Agent role and responsibilities follow.

Executive Agent Role. The team concluded that the contract administration offices' maturity in understanding the EVMS Executive Agent role was fairly well established. However, the team also concluded that while the contract administration offices generally understood their responsibilities, they were unclear on the actions needed for EVMS execution.

System Surveillance. The team found that only 47 percent of contract administration offices performed system surveillance, and that 68 percent of the contract administration offices did not distinguish between program and system surveillance. Of the contract administration offices that conducted system surveillance, 30 percent worked jointly with the contractor, while 18 percent attended contractor-led EVMS surveillance activities.

Program Analysis and Reporting. The contract administration offices maturity varied in providing useful program analysis and reporting. Although the contract administration offices performed strongly in earned value management followup, their program analysis of the contractor's EVMS data was limited. Specifically, the team found that 43 percent of contract administration offices linked risk analysis to earned value management; however, few contract administration offices linked EVMS data analysis with technical issues or performed risk analysis at lower levels of the work breakdown structure. Further, the team's survey showed that 44 percent of the contract administration offices did not add value to EVMS software-generated, statistical, contract estimates-at-completion. Lastly, 49 percent of the contract administration office did not review contractor baseline changes.

Reducing Variation in the Field. The team concluded that DCMC did not provide the contract administration offices with consistent direction on earned value management support and analysis. The survey results indicated that although most contract administration offices were familiar with EVMS policy and guidance, they did not consistently implement DCMC standards and expectations for earned value management. The survey results also indicated that formal training programs emphasized EVMS data analysis using contractor information, but did not equip EVMS monitors with specific concepts needed for forecasting and risk assessments of earned value management cost and schedule issues. Accordingly, the team concluded that DCMC needed to improve its EVMS guidance and training programs.

Team Recommendations. The team introduced six recommendations designed to raise the DCMC maturity level in EVMS and to reduce the variation among contract administration offices in their EVMS implementation. The team recommended that DCMC:

- **Increase DCMC EVMS Maturity.** In July 1999, DCMC will deploy an EVMS Capability Maturity Model. The model provides a five-step process that describes an evolutionary path from a chaotic EVMS processes to a very mature, disciplined EVMS process. The contract administration offices can use the EVMS Capability Maturity Model as a self-assessment tool to improve their EVMS capabilities. DCMC also plans to perform internal reviews at contract administration offices to assess DCMC EVMS maturity and improve contract administration office EVMS processes.

- **Improve DCMC EVMS Guidance.** The Defense Logistics Agency Directive 5000.4, Chapter 3.1.2., "Earned Value Management," will be revised to include policy and expectations for EVMS acceptance, withdrawal of acceptance, and the role of the contract administration offices in these processes. The chapter will also contain links to an EVMS Guidebook that will provide standard operating procedures for new EVMS monitors and technical staff with EVMS duties to reduce variation between contract administration office practices. The DCMC plans to issue the policy and the Guidebook in August 1999.

- **Implement an EVMS Training Strategy.** The EVMS training strategy will ensure that EVMS monitors are trained to perform credible and consistent EVMS functions. The DCMC plans to use videos, computer-based training, on-site presentations, the EVMS Center homepage, and formal training to accomplish the training strategy. The DCMC initiated the EVMS training strategy in April 1999.

- **Improve Contract Administration Offices' Understanding of the Executive Agent Role.** The DCMC intends to communicate the EVMS self-assessment review results to contract administration offices, management and corporate management councils, and the Performance Management Advisory Council, and solicit feedback from Government and industry to improve DCMC EVMS support. Furthermore, DCMC plans to maintain a database that will reflect the status of contractor EVMS validations. The DCMC initiated these actions in April 1999.

- **Emphasize Program Analysis and Reporting.** The team recommended that DCMC include predictive analytical techniques in EVMS training. Also, program support teams will use wInsight for EVMS data analysis, and risk management policy will be linked to EVMS policy. Lastly, the program support teams will document in the memorandums of agreement the integration of system surveillance and program analysis. The DCMC initiated these actions in April 1999.

- **Partner with Industry to Promote Contract Ownership of EVMS and Self-Oversight.** The DCMC will brief the Performance Management Advisory Council and industry associations to encourage industry to develop corporate-wide EVMS strategies and conduct self-oversight. Also, DCMC will sponsor pilot sites to test real-time access to contractor EVMS data and document lessons learned. The DCMC initiated these actions in April 1999.

Appendix E. Contract Administration Office Best Practices

Four of the five contract administration offices that we visited developed earned value management best practices that could be useful to other contract administration offices. The following discusses the best practices we observed.

DCMC - Boeing, Seattle, Washington. The contract administration office worked effectively with the contractor and the program office to address earned value management issues. Boeing Defense and Space Group, Seattle, Washington, provided the contract administration office with open access to its Intranet system to enable it to provide more timely EVMS data analysis and reports to the program managers. In addition, the contract administration office worked closely with the contractor to implement the contractor's EVMS Joint Surveillance Guide that documented the contractor's process for surveillance. The guide presented methods for performing risk assessments for the 32 EVMS criteria. The contractor and the contract administration office jointly use the risk assessments to determine what surveillance will be performed each month.

DCMC - Lockheed Martin Astronautics, Denver, Colorado. The contract administration office and the contractor developed a joint surveillance plan that included metrics to measure the health of the contractor's EVMS. The contract administration office developed the plan to eliminate as much subjectivity as possible in determining the health of the contractor's EVMS during system surveillance reviews. The contract administration office and the contractor established EVMS metrics and criteria in the plan with mutually agreed-upon tolerance for error. Based on an understanding of the contractor's EVMS, the contract administration office and the contractor tailored the metrics to the 32 EVMS criteria. The contract administration office's practice to develop metrics that measure the health of a contractor's EVMS is a useful tool to develop and implement an effective joint EVMS surveillance plan.

DCMC - Northrop-Grumman Corporation, Hawthorne, California. The contract administration office worked effectively with the contractor to obtain on-line access to the contractor's accounting system. As a result, the EVMS monitor for the F/A-18E/F Program reported daily performance results and issued a biweekly status report to the prime contract administration office and the Navy Program Manager. The program integrator for the F/A-18E/F Program stated that having the on-line access reduced the time to correct any cost, schedule, and technical performance issues that were discovered on the program. Further, he stated that when the monthly status report was issued, the F/A-18E/F Program Office was already aware of the issues and, in some cases, had initiated corrective action.

DCMC - Raytheon, Tucson, Arizona. The contract administration office developed and implemented a comprehensive five-level risk rating system. The contract administration office used EVMS data analysis as an integral tool to assign program risk. In addition, the contract administration office used Defense Contract Audit Agency resources to assist with EVMS reviews. To facilitate Defense

Contract Audit Agency involvement, the EVMS monitor developed a working agreement that clearly defined the Defense Contract Audit Agency's role and responsibilities.

Appendix F. Results of Survey to Program Management Offices

We surveyed 25 program management offices for which the 5 contract administration offices visited performed earned value management contract surveillance activities. We received responses from 24 of 25 program management offices. The survey was directed to the program management office staff members who had the primary responsibility for earned value management. The following are questions and the number and percent of program offices selecting each possible answer. We computed the percentages for each possible answer based on the number of program offices responding to each question. The program management offices contacted are listed after the survey results.

1. Describe your experience with earned value management. (24 responses)

a. less than 12 months	2	(8 percent)
b. 1 to 3 years	6	(25 percent)
c. greater than 3 years	16	(67 percent)

2. Which Defense Acquisition University/Defense Systems Management College EVMS training classes have you taken? (24 responses)

a. None	3	(13 percent)
b. Contractor Performance Measurement – Introduction (or equivalent)	5	(21 percent)
c. Contractor Performance Measurement – Intermediate (or equivalent)	2	(8 percent)
d. Contractor Performance Measurement – Introduction and Intermediate (or equivalent)	14	(58 percent)

3. Does the program management office regularly receive contractor performance report data electronically? (24 responses)

a. no	4	(17 percent)
b. yes	20	(83 percent)

4. How would you rate the usefulness of the EVMS data analysis provided in the contract administrative office program status report? (23 responses)

a. no value-added analysis	1	(4 percent)
b. little value-added analysis	7	(30 percent)
c. somewhat value-added analysis	8	(35 percent)
d. very important value-added analysis	7	(30 percent)

One program management office did not respond to this question because it did not receive program status reports.

5. In your opinion, is the earned value management information in the program status report received in time to make effective management decisions?
(23 responses)

    a. no   10 (43 percent)
    b. yes   13 (57 percent)

One program management office did not respond to this question because it did not receive program status reports.

6. Your office receives the contract administration office EVMS data analysis within:
(23 responses)

    a. 15 days of the end of the contractor's cycle
       for collecting earned value data   8 (35 percent)
    b. 30 days of the end of the contractor's cycle
       for collecting earned value data   5 (22 percent)
    c. 45 days of the end of the contractor's cycle
       for collecting earned value data   6 (26 percent)
    d. longer than 45 days   4 (17 percent)

One program management office did not respond to this question because it did not receive program status reports.

7. Does the contract administration office program status report mainly repeat earned value information that you either have access to or already knew about?
(24 responses)

    a. no   5   (21 percent)
    b. yes   19 (79 percent)

8. Does the contract administration office program status report explain the basis for its contract estimate-at-completion? (23 responses)

    a. no   2   (9 percent)
    b. yes   21 (91 percent)

One program management office did not respond to this question because it did not receive a contract estimate-at-completion.

9. Does the contract administration office program status report clearly explain any significant (greater than 5 percent) difference between the contract administration office's estimate-at-completion and the contractor's estimate-at-completion? (24 responses)

    a. no   5 (36 percent of 14 responses that had a significant difference)
    b. yes 9 (64 percent of 14 responses that had a significant difference)
    c. Not Applicable 10 (The contract administration office estimate-at-completion and contractor's estimate-at-completion for contracts have never varied by more than 5 percent)

10. What is the most useful aspect of and what, if any, improvements would you like to see in the EVMS data analysis provided in the contract administration office program status report?

The most useful aspects, as noted by the.program offices responding, were:

- having a third party view as a comparison point for the program management offices, and

- providing an on-site presence to monitor and work with the contractor

The top suggested areas for improvements were:

- providing more insightful analysis, and

- providing more timely analysis.

The following program management offices responded to our survey:

AIM-9X Missile
Airborne Laser
Airborne Warning and Control System
Airborne Warning and Control System North Atlantic Treaty Organization
Airborne Warning and Control System 767
All Source Analysis System
Atlas Medium Launch Vehicle
Atlas Space Launch Complex 3 East
B-1B Aircraft
B-2 Aircraft
Commanche Helicopter
Electronic Combat Integrated Test Program
Exoatmospheric Kill Vehicle
Evolved Sea Sparrow
F/A-18 E/F Aircraft
Global Positioning System
Joint Strike Fighter
Minuteman Propulsion Replacement Program
Medium Launch Vehicle System
National Missile Defense
Sense and Destroy Armor
Long-Term Mine Reconnaissance System
Standard Missile
Titan IV Missile

Appendix G. Report Distribution

Office of the Secretary of Defense

Under Secretary of Defense for Acquisition and Technology
    Deputy Under Secretary of Defense (Acquisition Reform)
    Director, Defense Procurement
    Director, Defense Logistics Studies Information Exchange
Under Secretary of Defense (Comptroller)
    Deputy Chief Financial Officer
    Deputy Comptroller (Program/Budget)

Department of the Army

Assistant Secretary of the Army (Financial Management and Comptroller)
Auditor General, Department of the Army

Department of the Navy

Assistant Secretary of the Navy (Financial Management and Comptroller)
Auditor General, Department of the Navy

Department of the Air Force

Assistant Secretary of the Air Force (Financial Management and Comptroller)
Auditor General, Department of the Air Force

Other Defense Organizations

Director, Defense Contract Audit Agency
Director, Defense Logistics Agency
    Commander, Defense Contract Management Command
    Commander, Defense Contract Management Command East
    Commander, Defense Contract Management Command West
Director, National Security Agency
    Inspector General, National Security Agency
Inspector General, Defense Intelligence Agency

Non-Defense Federal Organizations and Individuals

Office of Management and Budget
General Accounting Office
    National Security and International Affairs Division
        Technical Information Center

Congressional Committees and Subcommittees, Chairman and Ranking Minority Member

Senate Committee on Appropriations
Senate Subcommittee on Defense, Committee on Appropriations
Senate Committee on Armed Services
Senate Committee on Governmental Affairs
House Committee on Appropriations
House Subcommittee on Defense, Committee on Appropriations
House Committee on Armed Services
House Committee on Government Reform
House Subcommittee on Government Management, Information, and Technology,
    Committee on Government Reform
House Subcommittee on National Security, Veterans Affairs, and International Relations,
    Committee on Government Reform

Defense Logistics Agency Comments

DEFENSE LOGISTICS AGENCY
HEADQUARTERS
8725 JOHN J. KINGMAN ROAD, SUITE 2533
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REPLY
REFER TO   DDAI

JUL 1 2 1999

MEMORANDUM FOR ASSISTANT INSPECTOR GENERAL FOR AUDITING,
DEPARTMENT OF DEFENSE

SUBJECT: Draft Audit Report on Earned Value Management Support to System Acquisition
Program Managers (Project No 8AE-0025 02)

The draft report findings have been reviewed As referenced in the draft report, Defense
Contract Management Command (DCMC) conducted an internal Earned Value Management System
(EVMS) baseline assessment review Defense Contract Management Command is in agreement with the
report's findings The report, in its present form, incorporates suggested corrections resulting from prior
discussions between DCMC and DoD IG representatives Detailed comments are as follows:

Recommendation 1a: Revise Defense Logistics Agency Directive 5000 4, Defense Management
Command One Book, to require contract administration offices to prepare and provide program offices
with an annual system health assessment of the contractors earned value management system based on
the results of individual surveillance reviews and any corrective actions

DLA COMMENTS: The Defense Contract Management Command concurs with the recommendation
The Defense Logistics Agency Directive 5000 4, Defense Management Command One Book has been
revised to incorporate the recommendation The One Book revision has been completed and has been
posted to the DCMC Earned Value Management section of the DCMC web site in June 21, 1999 for a 30-
day field comment period before being officially incorporated The recommended action is expected to
be completed October 31, 1999

Recommendation 1b: Revise Defense Logistics Agency Directive 5000 4, Defense Management
Command One Book, to require contract administration offices to provide data analysis in the program
status report that focus on forecast and risk assessment based on the contractor s cost and schedule
performance data and explain variances of greater than 5 percent between the contract administration
offices and the contractors contract estimate at completion

DLA COMMENTS: The Defense Contract Management Command concurs in principal with the
recommendation The recommended action will be incorporated into a revision to the Defense Logistics
Agency Directive 5000 4 EVMS One Book Part 2.0, to require forecast and risk assessments However,
the content of DCMC program status and reported variances are based upon a memorandum of
agreement with each program office In addition, reportable variance breach thresholds are generally
mandated within the contract Defense Contract Management Command has included guidance on
performing predictive analysis using contractor EVMS data in a draft EVMS Guidebook This issue has
also been addressed in the revised One Book Program Integration Chapter The planned actions are
scheduled to be completed October 31 1999

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Recommendation 1c: Revise Defense Logistics Agency Directive 5000 4, Defense Management Command One Book, to require contract administration offices to request, whenever possible, on-line access to contractor earned value management system data

DLA COMMENTS: The Defense Contract Management Command concurs with the recommendation in principal. Defense Contract Management Command has been and continues to be in the forefront with gaining on-line access to contractor data through the Single Process Initiative, and most recently through the DoD Integrated Digital Environment (IDE) Initiative. The policy implementation date is FY 02 for Military Service program managers on their acquisition programs. This approach is necessary to preclude DCMC problems with contractual constructive change. The estimated completion date for this action is January 2002.

Recommendation 1d: Revise Defense Logistics Agency Directive 5000.4, Defense Management Command One Book, to require contract administration offices to coordinate the program status reports with the contractors accounting cycle for reporting contractor performance data to ensure that earned value management system data analysis is reported to the program manager on a timely basis.

DLA COMMENTS: Defense Contract Management Command concurs with the recommendation in principal. The timeline for delivery of program status reports is based upon receipt of the contractually required delivery of the contractor's Cost Performance Reports (CPR) and time required to conduct an analysis of the data. The delivery time for DCMC status reports is also an element of the memorandum of agreement between the Contract Administration Office and Program Office and is tied to the delivery of the CPR. The CPR is generated at the close of the contractor's accounting cycle and includes allotted time for contractor reconciliation of the data before delivery of their report. The recommended action is being addressed as part of DCMC's work with the Military Services and contractors to implement a digital integrated environment on all acquisition programs that would, in effect, provide direct on-line access to contractor data and reduce the time between data analysis and the contractor's accounting cycle. The estimated completion for the IDE initiative is January 2002

Recommendation 2: Implement earned value management performance measures that objectively measure the contract administration offices efforts to (1) Encourage the contractors to improve their internal EVMS and (2) DCMC improve their own internal EVM System and Program surveillance and reflect the contract administration office's maturity in working with earned value management

DLA COMMENTS: Defense Contract Management Command concurs with the recommendation: (1) DCMC is working with contractors to encourage improvements to their internal EVMS management Defense Contract Management Command is partnering with the 3 major prime systems contractors (Boeing, Lockheed Martin, and Raytheon), to improve the quality of their systems use of EVM Contractor improvements in EVM are also being addressed through the DCMC/Contractor management councils as another means to achieve the recommended improvements Since this activity is on-going, there is no estimated completion date (2) Actions are being implemented as a result of DCMC's internal EVMS Baseline reviews that address the recommendation to improve DCMC's internal EVM System and Program surveillance, and improve the maturity in working with earned value management As a result of the reviews DCMC has implemented an action plan that includes the development of an EVMS maturity model. DCMC has completed preliminary testing of the EVMS maturity model, and adjustments are being made to the model based upon the lessons learned from the early test results The model once fully implemented, will provide a measure of improvement in the contract administration office's EVM System and Program surveillance processes. The maturity model full deployment to contract administration offices is scheduled for September 1, 2000

contract administration offices is scheduled for September 1, 2000

Recommendation 3: Establish a best practice web site on the Defense Contract Management Command home page to enable contract administration offices to exchange earned value management best practices.

DLA COMMENTS: Defense Contract Management Command concurs with the recommendation to establish an interactive link to the existing DCMC EVMS web site The action will be added the DCMC EVMS action plan and should be completed by January 1, 2000.

If you have any questions, please forward them to Zora Henderson, DDAI, 767-6272.

E.R. CHAMBERLIN
Rear Admiral, SC, USN
Deputy Director

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Office of the Under Secretary of Defense for Acquisition and Technology Comments

OFFICE OF THE UNDER SECRETARY OF DEFENSE

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ACQUISITION AND
TECHNOLOGY

14 JUN 1999

MEMORANDUM FOR DIRECTOR, ACQUISITION MANAGEMENT DIRECTORATE
OFFICE OF THE INSPECTOR GENERAL

SUBJECT: Audit Report on Earned Value Management Support to System Acquisition
Program Managers (Project Nr. 8AE-0025 02)

We appreciate the opportunity to review the subject draft report. As the policy owner for Earned Value Management, we are very interested in the results of your audit and your recommendations for improvement. The following comment is offered to strengthen the report

Although the body of the report recognizes that contractors have the primary responsibility for Earned Value Management, the recommendations do not reflect that important point The amount of effort required of contract administration offices to support program managers depends on how well the contractor meets the earned value management system criteria objective "to develop and implement effective management control systems " We suggest that Recommendation 2 on p. 13 be modified to read as follows:

Recommendation 2: Implement earned value management performance measures that objectively measure the contract administration offices' efforts to (1) encourage the contractor to improve their internal EVMS system and (2) improve their own internal system and program surveillance, and that reflect the contract administration offices' maturity in working with earned value management

My point of contact for this action is Mr Van Kinney at (703) 695-5166 or email kinneyva@acq osd mil

John C Wilson, Jr
Director, Systems Acquisition

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The Acquisition Management Directorate, Office of the Assistant Inspector General for Auditing, DoD, prepared this report.

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